

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJIKIN INC

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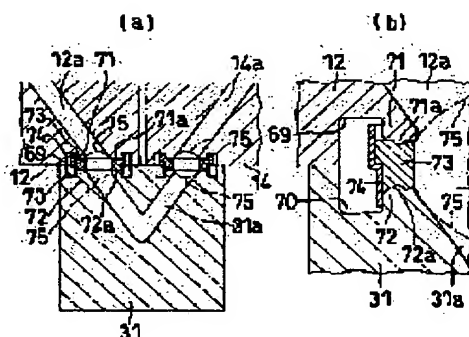
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(54) FLUID COUPLING MEMBER

(57)Abstract:

PROBLEM TO BE SOLVED: To eliminate a disadvantageous flow rate reducing factor in use of a block type coupling member having a V-shaped passage while securing an advantage of using it by forming a spherical fluid passage perforation auxiliary recess part in an opening of a fluid passage.

SOLUTION: In fluid coupling members 12, 31, fluid passages 12a, 31a tilting to the normal line direction of an abutting end face are formed, and gasket pressing annular projections 72, 73 are arranged so as to surround opening parts of the fluid passages 12a, 31a. In the openings of the fluid passages 12a, 31a, a spherical fluid passage perforation auxiliary recess part 75 is formed. In this way, a flow rate can be increased without causing any demerit such as generation of wrinkles in a gasket, and a disadvantageous flow rate reducing factor can be eliminated while securing advantage of using a block type coupling member having a V-shaped fluid passage.



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CLAIMS

[Claim(s)]

[Claim 1] The hydraulic-coupling member characterized by forming the fluid channel which inclines to the direction of a normal of a comparison end face, and forming the spherical-surface-like hollow for fluid channel punching assistance in opening of a fluid channel in the hydraulic-coupling member in which the annular projection for a gasket presser foot is prepared so that opening of a fluid channel may be surrounded.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the hydraulic-coupling member of the letter of a block used in case the outlet of a closing motion valve and the inlet port of a massflow controller are made to open for free passage in the fluid control unit used in semiconductor fabrication machines and equipment etc.

[0002]

[Description of the Prior Art] Drawing 3 shows the fluid control unit with which the hydraulic-coupling member of this invention is used. fluid control unit (4) which this is what this invention persons proposed (nine to Japanese-Patent-Application-No. 278473 reference), and is used in semiconductor fabrication machines and equipment etc. It is constituted by the cutoff disconnection machine (1) formed in the massflow controller (3), the left of this, and the method of the right, and (2). (Two or more valves (6) and (7) by which the inlet port and the outlet were established for each cutoff disconnection machine (1) and (2) in the inferior surface of tongue, 8), (9), and (10). It consists of a valve attachment base (28) in which each valve (6), (7), (8), (9), and (10) are attached together with the one direction free [attachment and detachment] from the upper part, and (29). The inflow way formation member (30) and (34) which have the path where a valve attachment base (28) and (29) lead to the inlet port of the valve (6) arranged at the end side, and (8), 1, or two or more free passage way formation members (31), (36) and (38) which have the path which opens the inlet port and outlet of an adjacent valve (6), (7), (8), (9), and (10) for free passage, The valve (7) arranged at the other end side, and (10) It is formed of the outflow way formation member (33) and (39) which have a path leading to an outlet.

[0003] It sets to this drawing and is (5) and (11). The left-hand side valve body (22) with which the joint section (40), (41), (60), and (61) were prepared, (25). It is the check valve which consists of a central valve body (23), (26), and a right-hand side valve body (24) and (27). (32), (35), and (37) It is the subpath formation member which consists of (a joint attachment component (47), (51), (53) and the joint section (48) and (52), and 54), and (49) and (50) are a massflow controller (3). It is the rectangular parallelepiped-like overhang section which has the path which it was prepared in the lower limit section, and placed opening upside down. Each closing motion valve (6), (7), (8), (9), and (10) [moreover,] It consists of the actuator (13) which is attached in a valve body (12), (14), (16), (18), (20), and this from the upper part, and carries out cutoff disconnection of the passage in a valve body (12), (14), (16), (18), and (20) suitably, respectively, (15), (17), (19), and (21). it saw from after being prepared in the lower limit section of a valve body (12), (14), (16), (18), and (20), and the rectangular flange (12a) (14a) (16a) (18a) (20a) was thrust from the upper part -- ****ing (illustration abbreviation) -- it is combined with a valve attachment base (28) and (29).

[0004]

[Problem(s) to be Solved by the Invention] In each above-mentioned cutoff disconnection machine (1) and (2), although the letter joint member of a block (31), (33), (34), (36), and (39) have the advantage of reduction of the number of components, and the ease of heating at a heater V character-like path (34a) (36a) (39a) (31a) (33a) When the letter joint member of a block (31) which it has, (33), (34), (36), and (39) are used, as compared with the passage formation member which has a U character-like path Since [that the path of the opening is the same] the diameter of passage becomes small but, it is disadvantageous from the point of a flow rate rise.

[0005] Drawing 4 (a) and (b) are what expands and shows the conventional hydraulic-coupling member. (a) It is the expanded sectional view of the valve body (12) of the 1st closing motion valve shown in drawing 3, the valve body (14) of the 2nd closing motion valve, and the comparison section of a free passage way

formation member (31), and (b) is the sectional view which expanded further the valve body (12) of the 1st closing motion valve, and the comparison section of a free passage way formation member (31). As shown in this drawing, the conventional hydraulic-coupling member (12) and (31) to the hollow established in the comparison end face of each part material (12) and (31). The cylindrical lobe (81) which has the annular projection for a gasket presser foot (81a) (82a) at a tip, and (82) are prepared. It consists of a short opening path (85a) (86a) where the fluid channel (85) of each part material (12) and (31) and (86) are formed of the inner skin of a cylindrical lobe (81) and (82), and lie at right angles to a comparison end face, and this path (85b) (86b) which stands in a row in the shape of an inclination in this. The gasket (73) in a circle held at the retainer (74) is made to intervene between both members (12) and (31), and the retainer (74) is attached in the periphery section of the cylindrical lobe (72) of the letter joint member of a block (31).

[0006] In the hydraulic-coupling member (12) formed as mentioned above and (31), the path of this path (85b) (86b) is restrained by the short existence of an opening path (85a) (86a) which lies at right angles to a comparison end face, and there was a problem that the cross section of a path was not secured, as a result.

[0007] The purpose of this invention is to offer the hydraulic-coupling member which can remove the flow rate fall factor which is that fault, securing the advantage using the letter joint member of a block which has a V character-like path.

[0008]

[Means for Solving the Problem] The hydraulic-coupling member by this invention is characterized by forming the fluid channel which inclines to the direction of a normal of a comparison end face, and forming the spherical-surface-like hollow for fluid channel punching assistance in opening of a fluid channel in the hydraulic-coupling member in which the annular projection for a gasket presser foot is prepared so that opening of a fluid channel may be surrounded.

[0009] Here, the word of a hydraulic-coupling member shall also include the valve body with which the actuator for fluid channel cutoff disconnection other than the letter hydraulic-coupling member of a block used in case the outlet of a closing motion valve and the inlet port of a massflow controller are made to open for free passage was attached.

[0010]

[Embodiment of the Invention] The gestalt of implementation of this invention is explained with reference to a drawing below.

[0011] Drawing 1 (a) and (b) are what shows the hydraulic-coupling member of this invention. (a) It is the expanded sectional view of the valve body (12) of the 1st closing motion valve shown in drawing 3, the valve body (14) of the 2nd closing motion valve, and the comparison section of a free passage way formation member (31), and (b) is the sectional view which expanded further the valve body (12) of the 1st closing motion valve, and the comparison section of a free passage way formation member (31). In this drawing, the same sign is given to the thing of the same configuration as drawing 4, and explanation is omitted.

[0012] Setting to this drawing, each part material (12), (14), and (31) are a slanting fluid channel (12a) (14a) (31a). It has. The hollow (69) of a cross-section round shape and (70) are prepared in that comparison end face, respectively, and the cylindrical lobe (71) which has the annular projection for a gasket presser foot (71a) (72a) at a tip in this hollow (69) and (70), and (72) are prepared. The short opening path (85a) (86a) which lies at right angles to a comparison end face at the open end of each slanting fluid channel (12a) (14a) (31a) cannot be opened, but it replaces with this, and the spherical-surface-like hollow for fluid channel punching assistance (75) is formed in the comparison end face. Fluid channel (31a) (12a) (14a) The path of opening is made equally to the bore of a gasket (73). Fluid channel (31a) (12a) (14a) It is made smaller [the path of the spherical-surface-like hollow (75) in opening is equal to the bore of a gasket (73), therefore] than the bore of the annular projection for a gasket presser foot (71a) (72a) prepared outside a little from the inner circumference of a gasket (73).

[0013] Each slant-like fluid channel (31a) (12a) (14a) Fluid channel (31a) (12a) (14a) It has opened with the path almost equal to the path of the spherical-surface-like hollow (75) in opening. As shown in drawing 2 (a), the spherical-surface-like hollow (75) where an overall diameter is equal to the bore of a gasket (73) is first formed in a comparison end face. Namely, subsequently slanting fluid channel (31a) which has the path of the magnitude equivalent to the overall diameter of this spherical-surface-like hollow (75) it can open -- slant-like fluid channel (12a) (14a) (31a) of each part material (12), (14), and (31) It is formed.

[0014] According to the hydraulic-coupling member of this invention, it is a fluid channel (12a) (14a) (31a) from this path (85b) (86b) of the hydraulic-coupling member shown in drawing 4. The path is large. Moreover, since the annular projection for a gasket presser foot (71a) (72a) is in contact with the direction

center section of a path of the gasket (73) The flow rate rise is achieved without there being no stress concentration to the gasket (73) common-law-marriage section, therefore producing demerits, such as generating of the wrinkling of a gasket (73).

[0015]

[Effect of the Invention] The flow rate fall factor which is that fault is removable, securing the advantage using the letter joint member of a block which has a V character-like fluid channel, since a flow rate rise can be performed about the hydraulic-coupling member which inclines to the direction which a fluid channel compares and intersects perpendicularly with an end face according to the hydraulic-coupling member of this invention, without producing demerits, such as generating of the wrinkling of a gasket.

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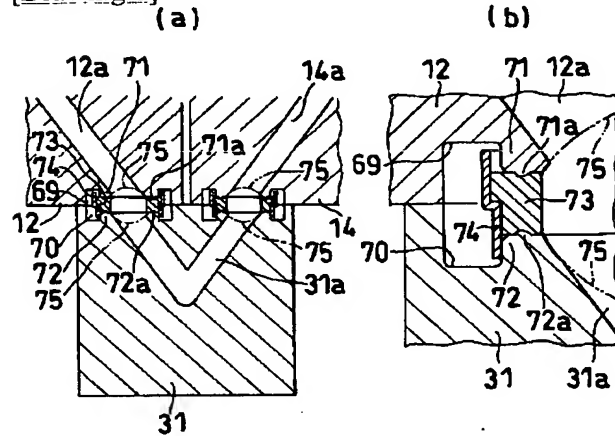
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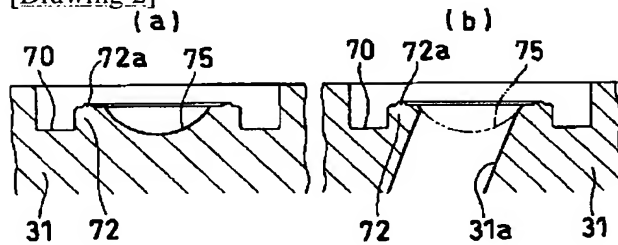
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DRAWINGS

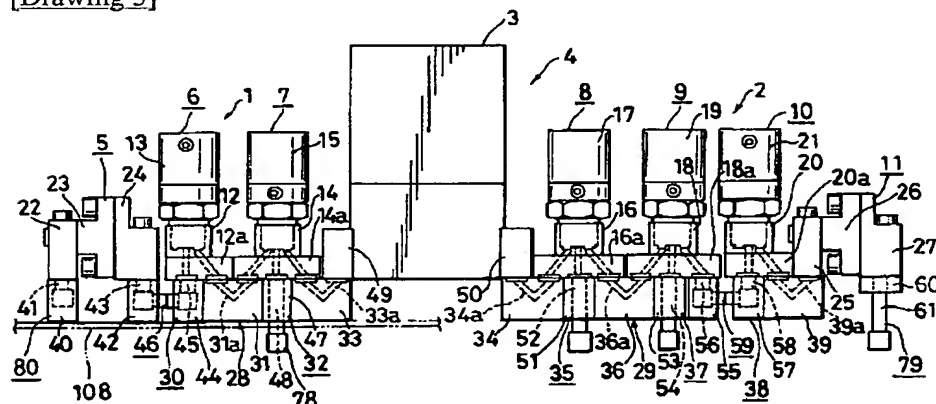
[Drawing 1]



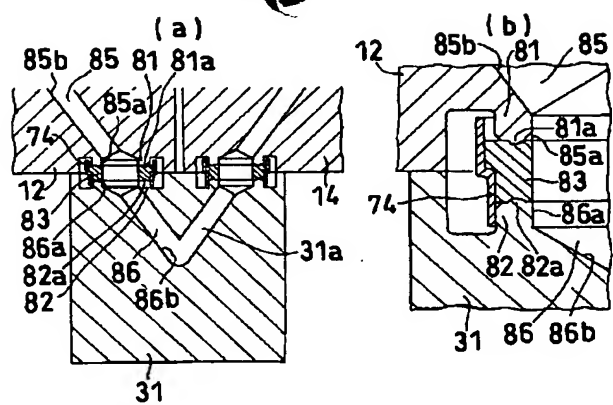
[Drawing 2]



[Drawing 3]



[Drawing 4]



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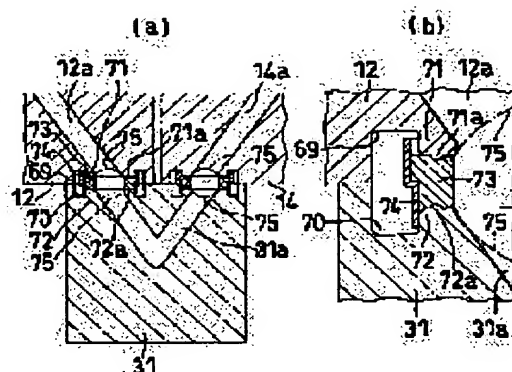
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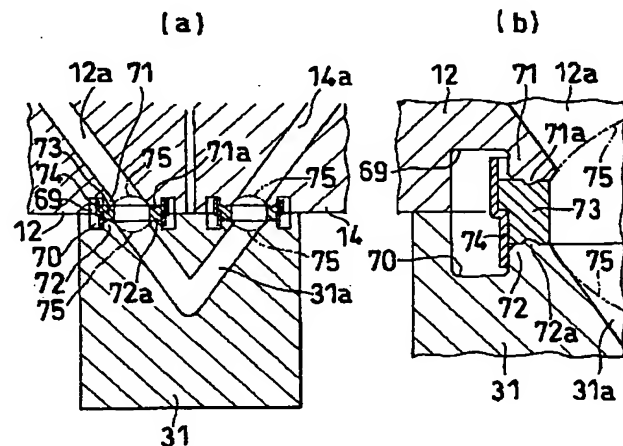
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(54) 【発明の名称】 流体継手部材

(57) 【要約】

【課題】 V字状通路を有するブロック状継手部材を用いる利点を確保しつつ、その欠点である流量低下要因を除去することができる。

【解決手段】 流体継手部材12, 31 には、突き合わせ端面の法線方向に対して傾斜する流体通路12a, 31a が形成され、流体通路12a, 31a の開口を囲むようにガスケット押さえ用環状突起72, 73 が設けられている。流体通路12a, 31a の開口に、球面状の流体通路穿孔補助用凹所75が形成されている。



【特許請求の範囲】

【請求項 1】 突き合わせ端面の法線方向に対して傾斜する流体通路が形成され、流体通路の開口を囲むようにガスケット押さえ用環状突起が設けられている流体継手部材において、流体通路の開口に、球面状の流体通路穿孔補助用凹所が形成されていることを特徴とする流体継手部材。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 この発明は、半導体製造装置等において用いられる流体制御装置において、例えば、開閉弁の出口とマスフローコントローラの入口とを連通させるさいなどに使用されるブロック状の流体継手部材に関する。

【0002】

【従来の技術】 図 3 は、この発明の流体継手部材が使用される流体制御装置を示している。これは、本発明者らが提案したもので（特願平 9-278473 参照）、半導体製造装置等において用いられる流体制御装置(4)は、マスフローコントローラ(3)およびこれの左方および右方に設けられた遮断開放器(1)(2)により構成されており、各遮断開放器(1)(2)が、入口および出口が下面に設けられた複数の弁(6)(7)(8)(9)(10)と、各弁(6)(7)(8)(9)(10)が上方から着脱自在に一方方向に並んで取り付けられている弁取付基部(28)(29)とよりなり、弁取付基部(28)(29)が、一端側に配置された弁(6)(8)の入口に通じる通路を有する流入路形成部材(30)(34)と、隣り合う弁(6)(7)(8)(9)(10)の入口と出口とを連通する通路を有する 1 または複数の連通路形成部材(31)(36)(38)と、他端側に配置された弁(7)(10)の出口に通じる通路を有する流出路形成部材(33)(39)とによって形成されている。

【0003】 同図において、(5)(11)は、継手部(40)(41)(60)(61)が設けられた左側弁本体(22)(25)、中央弁本体(23)(26)および右側弁本体(24)(27)よりなる逆止弁であり、(32)(35)(37)は、継手保持部材(47)(51)(53)および継手部(48)(52)(54)からなる副通路形成部材であり、(49)(50)は、マスフローコントローラ(3)の下端部に設けられかつ下向きに開口した通路を有する直方体状張出部である。また、各開閉弁(6)(7)(8)(9)(10)は、それぞれ、弁本体(12)(14)(16)(18)(20)およびこれに上方から取り付けられて弁本体(12)(14)(16)(18)(20)内の流路を適宜遮断開放するアクチュエータ(13)(15)(17)(19)(21)よりなり、弁本体(12)(14)(16)(18)(20)の下端部に設けられた上から見て方形のフランジ部(12a)(14a)(16a)(18a)(20a)が上方からねじ込まれたねじ（図示略）により弁取付基部(28)(29)に結合されている。

【0004】

【発明が解決しようとする課題】 上記の各遮断開放器(1)(2)において、ブロック状継手部材(31)(33)(34)(36)(39)は、部品数の低減とヒーターによる加熱の容易さと

いう利点を有しているが、V字状通路(31a)(33a)(34a)(36a)(39a)を有するブロック状継手部材(31)(33)(34)(36)(39)を用いた場合、U字状通路を有する流路形成部材と比較すると、その開口部の径が同じでも流路径が小さくなるため、流量アップという点からは不利になっている。

【0005】 図 4 (a) (b) は、従来の流体継手部材を拡大して示すもので、(a) は、図 3 に示した第 1 開閉弁の弁本体(12)、第 2 開閉弁の弁本体(14)および連通路形成部材(31)の突き合わせ部の拡大断面図であり、

(b) は、第 1 開閉弁の弁本体(12)および連通路形成部材(31)の突き合わせ部をさらに拡大した断面図である。従来の流体継手部材(12)(31)は、同図に示すように、各部材(12)(31)の突き合わせ端面に設けられた凹所に、ガスケット押さえ用環状突起(81a)(82a)を先端に有する円筒状突出部(81)(82)が設けられ、各部材(12)(31)の流体通路(85)(86)が、円筒状突出部(81)(82)の内周面により形成され突き合わせ端面に直交している短い開口部通路(85a)(86a)と、これに傾斜状に連なる本通路(85b)(86b)とよりなるものである。両部材(12)(31)間には、リテーナ(74)に保持された円環状ガスケット(73)が介在させられており、リテーナ(74)は、ブロック状継手部材(31)の円筒状突出部(72)の外周部に取り付けられている。

【0006】 上記のように形成された流体継手部材(12)(31)では、突き合わせ端面に直交している短い開口部通路(85a)(86a)の存在により、本通路(85b)(86b)の径が制約されており、結果として、通路の断面積が確保されないという問題があった。

【0007】 この発明の目的は、V字状通路を有するブロック状継手部材を用いる利点を確保しつつ、その欠点である流量低下要因を除去することができる流体継手部材を提供することにある。

【0008】

【課題を解決するための手段】 この発明による流体継手部材は、突き合わせ端面の法線方向に対して傾斜する流体通路が形成され、流体通路の開口を囲むようにガスケット押さえ用環状突起が設けられている流体継手部材において、流体通路の開口に、球面状の流体通路穿孔補助用凹所が形成されていることを特徴とするものである。

【0009】 ここで、流体継手部材という語は、開閉弁の出口とマスフローコントローラの入口とを連通させるさいなどに使用されるブロック状流体継手部材のほか、流体通路遮断開放用のアクチュエータが取り付けられた弁本体も含むものとする。

【0010】

【発明の実施の形態】 この発明の実施の形態を、以下図面を参照して説明する。

【0011】 図 1 (a) (b) は、この発明の流体継手部材を示すもので、(a) は、図 3 に示した第 1 開閉弁の弁本体(12)、第 2 開閉弁の弁本体(14)および連通路形

成部材(31)の突き合わせ部の拡大断面図であり、(b)は、第1開閉弁の弁本体(12)および連通路形成部材(31)の突き合わせ部をさらに拡大した断面図である。同図において、図4と同じ構成のものには、同じ符号を付して説明を省略する。

【0012】同図において、各部材(12)(14)(31)は斜め状の流体通路(12a)(14a)(31a)を有しており、その突き合わせ端面に、それぞれ断面円形の凹所(69)(70)が設けられ、この凹所(69)(70)に、ガスケット押さえ用環状突起(71a)(72a)を先端に有する円筒状突出部(71)(72)が設けられている。各斜め状の流体通路(12a)(14a)(31a)の開口端部には、突き合わせ端面に直交している短い開口部通路(85a)(86a)は開けられておらず、これに代えて、突き合わせ端面には、球面状の流体通路穿孔補助用凹所(75)が形成されている。流体通路(12a)(14a)(31a)の開口の径は、ガスケット(73)の内径と等しくなされている。流体通路(12a)(14a)(31a)の開口における球面状凹所(75)の径は、ガスケット(73)の内径と等しく、したがって、ガスケット(73)の内周から若干外側に設けられているガスケット押さえ用環状突起(71a)(72a)の内径より

【0013】各斜め状流体通路(12a)(14a)(31a)は、流体通路(12a)(14a)(31a)の開口における球面状凹所(75)の径にほぼ等しい径で開けられている。すなわち、図2(a)に示すように、まず、突き合わせ端面に最大径がガスケット(73)の内径と等しい球面状凹所(75)が形成され、次いで、この球面状凹所(75)の最大径に相当する大きさの径を有する斜め状の流体通路(31a)が開けられることにより、各部材(12)(14)(31)の斜め状流体通路(12a)(14a)(31a)が形成されている。

【0014】この発明の流体継手部材によると、図4に

示した流体継手部材の本通路(85b)(86b)よりも流体通路(12a)(14a)(31a)の径が大きくなっており、また、ガスケット押さえ用環状突起(71a)(72a)がガスケット(73)の径方向中央部に接しているので、ガスケット(73)内縁部への応力集中がなく、したがって、ガスケット(73)のしわの発生などのデメリットを生じることなく流量アップが図られている。

【0015】

【発明の効果】この発明の流体継手部材によると、流体通路が突き合わせ端面に直交する方向に対して傾斜している流体継手部材について、ガスケットのしわの発生などのデメリットを生じることなく流量アップができるので、V字状流体通路を有するブロック状継手部材を用いる利点を確保しつつ、その欠点である流量低下要因を除去することができる。

【図面の簡単な説明】

【図1】この発明による流体継手部材を示す断面図である。

【図2】この発明による流体継手部材の要部および製造方法を示す部分拡大断面図である。

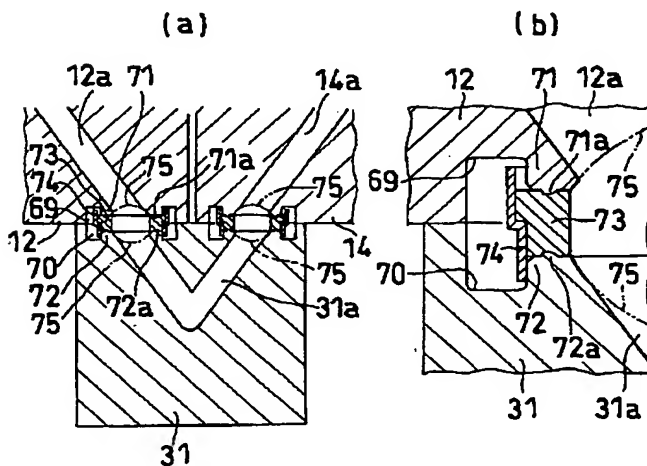
【図3】この発明による流体継手部材が使用される流体制御装置を示す図である。

【図4】従来の流体継手部材を示す断面図である。

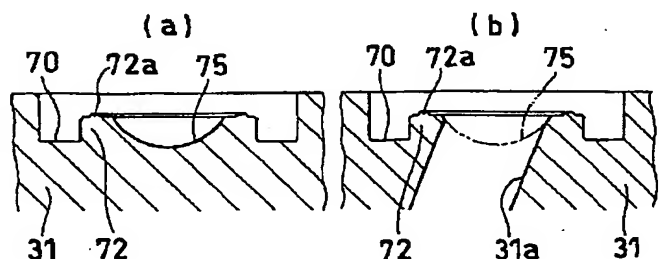
【符号の説明】

(12)	第1開閉弁本体
(14)	第2開閉弁本体
(31)	連通路形成部材
(12a)(14a)(31a)	斜め状流体通路
(71a)(72a)	ガスケット押さえ用環状突起
(75)	流体通路穿孔補助用凹所

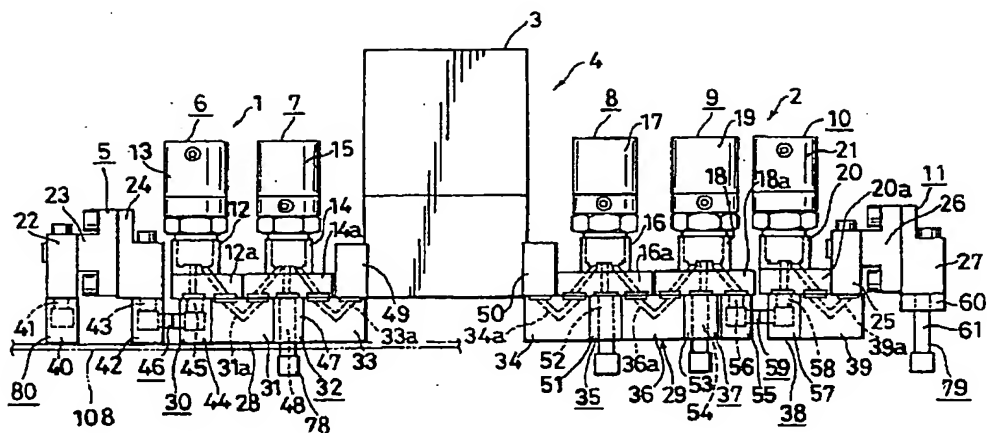
【図1】



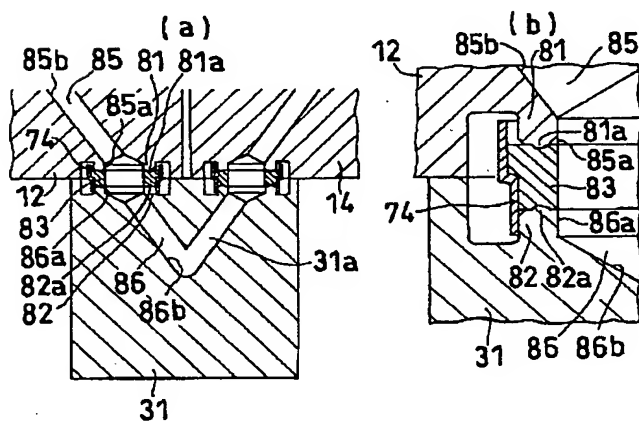
【図2】



【図 3】



【図 4】



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